WHAT IS CLAIMED IS:

1. A method of determining whether a multi-component target system meets a given multi-part performability requirement, the method comprising:

operating on a representation of the target system, providing a first failure-scenario analysis of said target system,

generating a multi-part performability function of said target system using said first failure-scenario analysis,

comparing said multi-part performability function with said multi-part performability requirement, and

determining from said comparing whether said target system meets said multi-part performability requirement.

2. The method as set forth in claim 1, the step of comparing further comprising:

calculating if said first failure-scenario analysis provides sufficient data for generating a multi-part performability function determinative of target system performance capability when compared to said multi-part performability requirements, and

if so, proceeding with said step of determining, or

if not, providing a second failure-scenario analysis of said target system; and

repeating said steps of generating, comparing, and calculating until a next failure-scenario analysis provides sufficient data for generating a multi-part performability function determining said target system performance capability when compared to said multi-part performability requirements.

3. The method as set forth in claim 1, wherein said multi-part performability requirements are represented as one or more performance levels versus percentage of time at each of said performance levels.

4. The method as set forth in claim 3, wherein the step of generating a multi-part performability function comprises:

creating a multi-part performability curve as one or more performance levels versus percentage of time at each of said performance levels.

5. The method as set forth in claim 1, the step of operating on a representation of the target system comprising:

synthesizing a model of the target system based on predetermined individual components of the target system wherein each of said components has a characteristic failure specification.

6. The method as set forth in claim 5, further comprising the steps of:

combining one or more said components as a macro-component;

computing the failure probability of the macro-component as a function of the failure probabilities of its respective one or more components; and

using macro-components in said failure-scenario analysis.

7. The method as set forth in claim 1, wherein the step of providing a first failure-scenario analysis of said target system comprises performing a failure-scenario analysis in accordance with the further steps of:

let "FP(c)" denote a probability that a system component "c" of the target system will fail; then,

(1) Let "D" represent a failure-free system;

(2) Let "c_1, c_2. . .c_{mf} be components that can fail independently in D;

(3) Let "sf" be the number of concurrent failures being considered in the last invocation (initially 0);

(4) Let "s" be the ordinal number, among the scenarios with exactly "sf" failures, of the scenario returned in the last invocation (initially 0);

(5) If there exist exactly "s" scenarios with "sf" concurrent failures, then sf = sf+l; s = 0;

(6) If sf $\leq$ mf, then s = s+l, otherwise exit;

(7) choose a_1, a_2. . .a_{sf} (where a_i, i=l, . . . sf are different integers between 1 and mf) such that there are exactly "s-1" scenarios with "sf"

concurrent failures more likely to occur than c_{a1}, c_{a2}. . .c_{asf};

(8) set sc = D with components c_{a1}, c_{a2}. . .c_{asf} marked as failed;

(9) set p = $FP(c_{a1})$ x $FP(c_{a2})$ x . . . x $FP(c_{a(sf)})$ x (1-$FP(c_{b1})$) x . . .x (1-$FB(c_{b(mf-sf)})$), where c_{b1},. . .$C_{b(mf-sf)}$ are all the components that did not fail in "sc"; and

(10) return (sc,p).

8. The method as set forth in claim 1, the step of providing a first failure-scenario analysis of said target system further comprising:

eliminating analysis of all failure-scenarios wherein said target system is non-functional in accordance with said multi-part performability requirement, and

eliminating analysis of all failure-scenarios wherein said target system is fully functional in accordance with said multi-part performability requirement.

9. The method as set forth in claim 8, the step of generating a multi-part performability function comprising further steps of:

entering a multi-part performability function indicative of all failure-scenarios wherein said target system is non-functional; and

entering a multi-part performability function indicative of all failure-scenarios wherein said target system is fully functional in accordance with said multi-part performability requirements.

10. The method as set forth in claim 1, the step of providing a first failure-scenario analysis of said target system comprising:

failure-scenarios are repetitively entered based on an order beginning with a most likely failure-scenario.

11. The method as set forth in claim 10, comprising the steps of:

if a multiplicity of like components having like failure probability and effect are employed within said target system, treating said multiplicity of like components as a single component of said target system.

12. The method as set forth in claim 1, further comprising:

verifying an equation for a predetermined target system and given multi-part performability requirements:

$$\sum_{k=1}^{M} OP(S_i)\, 1(U(S_i) \geq r_i) \geq f_i, \text{ for } j=1, \ldots,n$$

where "j" is a failure-scenario among failure-scenarios with "i" failures, returned in the last invocation, and performance of the target system is at least r_j with probability f_j, or greater, for each given pair (r_j,f_j).

13. The method as set forth in claim 12, the step of verifying the equation further comprising:

(1) set i = 1;

(2) generate the next state S_i and its occurrence probability $OP(S_i)$, from said step of generating the next failure scenario;

(3) compute $U(S_i)$ using a performance predictor; and

(4) if,

$$\sum_{k=1}^{i} OP(S_k)\, 1(U(S_k) \geq r_j) \geq f_j, \text{ for all } j=1,2,\ldots n,$$

then the target system is capable of fulfilling the multi-part performability requirements, exit and report; or

(5) if,

$$\sum_{k=1}^{i} OP(S_k)\, 1(U(S_k) < r_j) \geq 1-f_j, \text{ for any } j=1,2,\ldots n,$$

then the target system fails the multi-part performability requirements, exit and report; and otherwise,

(6) set i = i +1 and go to step (2).

14. A computer memory comprising:

computer code operating on a representation of the target system, providing a first failure-scenario analysis of said target system;

computer code providing a first failure-scenario analysis of said target system;

computer code generating a multi-part performability function using said first failure-scenario analysis;

computer code comparing said multi-part performability function with said multipart performability requirements; and

computer code determining from said comparing whether said target system has a capability of performing said multi-part performability requirements.

15. The memory as set forth in claim 14, the computer code comparing further comprising computer code:

calculating if said first failure-scenario analysis provides sufficient data for generating a multi-part performability first function determinative of predicting multi-part performability when compared to said multi-part performability requirements, and

if so, proceeding with said step of determining; or

if not,

providing a second failure-scenario analysis of said target system;

repeating by generating a multi-part performability next function;

comparing said next function with said multi-part performability requirement; and

calculating until a next failure-scenario analysis provides sufficient data for generating a multi-part performability second function determinative of predicting multi-part performability of said system when compared to said multi-part performability requirements.

16. The memory set forth in claim 15, the computer code providing a first failure-scenario analysis of said target system further comprising:

eliminating all failure-scenarios wherein said target system is non-functional; and

eliminating all failure-scenarios wherein said target system is fully functional in accordance with said performance requirements.

17. The memory as set forth in claim 16, the code providing a first failure-scenario analysis of said target system further comprising:

failure-scenarios are repetitively entered based on an order beginning with a most likely failure-scenario.

18. A method of doing business of verifying performability of a target system having predetermined components and predetermined multi-part performability requirements, the method comprising: using a computer,

(1) operating on a representation of the target system, including providing a failure-scenario analysis of said target system;

(2) generating a multi-part performability curve using said failure-scenario analysis;

(3) comparing said requirements with said curve ;

(4) determining from said comparing whether said target system has the capability of performing said multi-part performability requirements; and

(5) generating a report indicating of results whether said target system has the capability of performing said multi-part performability requirements.

19. The method of doing business as set forth in claim 18 further comprising:

calculating if a first failure-scenario analysis provides sufficient data for generating a multi-part performability curve determinative of whether said multi-part performability requirements are satisfied; and

if so, proceeding with said step of determining, or

if not,

providing a second failure-scenario analysis of said target system;

repeating the processes of generating a multi-part performability curve;

comparing said requirements with said curve; and

calculating until a next failure-scenario analysis provides sufficient data

for generating a report predicting multi-part performability of the target system with respect to said requirements.

20. The method as set forth in claim 19, the step of providing a first failure-scenario analysis of said target system comprising:

failure-scenarios are repetitively entered based on an order beginning with a most likely failure-scenario.

21. A method of reporting performability of a given data storage system under a given system performance requirements specification, the method comprising:

generating a plurality of failure scenarios indicative of individual component failures;

determining performance states of said system under each of said failure scenarios;

comparing a function indicative of said performance states to said system performance requirements specification; and

based on a comparison derived from said step of comparing, reporting whether the performability of the given system meets the given system performance requirements specification